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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/228,772	01/06/1999	JACOB BENESTY	BENESTY21613	8127

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EXAMINER

SWERDLOW, DANIEL

ART UNIT	PAPER NUMBER
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2644

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DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/228,772

Applicant(s)

BENESTY ET AL.

Examiner

Daniel Swerdlow

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-16 is/are allowed.
- 6) ☒ Claim(s) 1,2,11 and 12 is/are rejected.
- 7) ☒ Claim(s) 4 and 6-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by

Kanemasa et al. (US Patent 4,621,172).

3. Regarding Claim 1, Kanemasa discloses: an adaptive digital filter (Fig. 4, reference 20; column 1, lines 33-34) that corresponds to the **fast impulse response filter** claimed; a multiplier (Fig. 4, reference 52; column 5, lines 9-12) that corresponds to the **coefficient vector update device** claimed and provides tap correction (i.e., **feeding adaptive coefficients**) based on a residual echo signal (column 2, lines 13-14) that corresponds to the **received error signal** claimed; a correction coefficient generator (column 4, lines 55-65; column 11, lines 2-4; Fig. 4, reference 50, 54, 56, 58, 60, 62, 64) that corresponds to the **modifying device** claimed for correcting (i.e., **modifying**) **coefficients adaptively** (column 4, line 60) using a sign bit extractor and hysteresis (i.e., **non-linearity**) (Fig. 4, reference 50, 64) and weighting (i.e., **scaling**) (Fig. 4, reference 62; column 5, lines 6-8); and interruption of adaptation during double-talk (i.e., **a double talk detector for disabling the update device in response to double talk**) (column 10, lines 30-34) when used for speech transmission (i.e., **on a telephone circuit**). Therefore, Kanemasa anticipates all elements of Claim 1.

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4. Claim 2 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos of Claim 1. The fast impulse response filter adaptive filter and coefficient vector update device of Claim 1 correspond to the **adaptive filter utilizing a fast converging adaptive algorithm** claimed and the modifying device of Claim 1 corresponds to the **means for modifying** claimed.

5. All elements of Claim 11 are comprehended by Claim 1. Claim 11 is rejected for reasons stated above apropos of Claim 1.

6. Claim 12 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos of Claim 1.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kenemasa in view of Duttweiler (US Patent 5,951,626). As stated above apropos of Claim 2, Kenemasa discloses all elements of Claim 3 except the **algorithm being PNLMS**. Duttweiler discloses use of the **PNLMS algorithm** (column 1, lines 40-44). It would have been obvious to one skilled in the art at the time of the invention to apply the PNLMS algorithm as taught by Duttweiler to the echo canceller taught by Kenemasa for the purpose of providing significantly faster adaptation without

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sacrificing estimation quality or significantly increasing computational burden (Duttweiler: column 1, lines 44-48).

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kenemasa in view of Gay (US Patent 5,428,562). As stated above apropos of Claim 2, Kenemasa discloses all elements of Claim 5 except the **algorithm being APA**. Gay discloses use of the **APA algorithm** (column 2, lines 54-63). It would have been obvious to one skilled in the art at the time of the invention to apply the APA algorithm as taught by Gay to the echo canceller taught by Kenemasa for the purpose of providing fast convergence with low complexity (Gay: column 1, lines 39-42).

Allowable Subject Matter

10. Claims 13 through 16 are allowed.

11. The following is an examiner's statement of reasons for allowance:

12. Claim 13 is essentially similar to Claim 11 with the additional limitation that the update formula is: $h_{n+1} = h_n + (\mu / (x_n^T G_n x_n + \delta)) G_n x_n \varphi(|e_n|) \text{sign}\{e_n\}$. As stated above apropos of Claim 11, Kenemasa anticipates all elements of that claim. In addition, as applicant discloses (page 10, equation 14) $h_{n+1} = h_n + (\mu / (x_n^T G_n x_n + \delta)) G_n x_n e_n$ is the update formula for the prior art PNLMS algorithm. As stated above apropos of Claim 3, the combination of the PNLMS algorithm and a scaled adaptive non-linearity is obvious. However the particular scaled adaptive non-linearity produced by substituting $\varphi(|e_n|) \text{sign}\{e_n\}$ for the e_n factor in the update term is neither anticipated nor made obvious by the prior art. Therefore, Claim 13 is allowable.

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13. Claim 14 is allowable due to dependence from Claim 13.

14. Claim 15 is essentially similar to Claim 11 with the additional limitation that the update formula is: $h_{n+1} = h_n + \mu G_n X_n R_{xx}^{-1}(n) [\varphi(|e_n|) \odot \text{sign}(e_n)]$. As stated above apropos of Claim 11, Kenemasa anticipates all elements of that claim. In addition, as applicant discloses (page 25, equation 58) this is the update formula for a robust version of the prior art APA algorithm. As stated above apropos of Claim 5, the combination of the APA algorithm and a scaled adaptive non-linearity is obvious. However the particular version of the APA algorithm claimed is neither anticipated nor made obvious by the prior art. Therefore, Claim 15 is allowable.

15. Claim 16 is allowable due to dependence from Claim 15.

16. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

17. Claims 4, 6 and 7 through 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. Claim 4 claims the filter of Claim 2 wherein the algorithm is PNLMS++. As stated above apropos of Claim 2, Kenemasa anticipates all elements of that claim. However, the PNLMS++ algorithm claimed, as defined in applicant's disclosure, is neither anticipated nor made obvious by the prior art. Therefore, Claim 4 is allowable matter.

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19. Claim 6 claims the filter of Claim 2 wherein the algorithm is PAPA. As stated above apropos of Claim 2, Kenemasa anticipates all elements of that claim. However, the PAPA algorithm claimed, as defined in applicant's disclosure, is neither anticipated nor made obvious by the prior art. Therefore, Claim 6 is allowable matter.

20. Claim 7 claims the filter of Claim 3 wherein the adaptive scaled nonlinearity is given by: $\Psi(|e_n|/s)\text{sign}\{e_n\}s_n$. As stated above apropos of Claim 3, the combination of Kenemasa and Duttweiler makes obvious all elements of that claim. However, the particular formula for the adaptive scaled nonlinearity claimed is neither anticipated nor made obvious by the prior art. Therefore, Claim 7 is allowable matter.

21. Claim 8 is allowable matter due to dependence from Claim 4.

22. Claim 9 claims the filter of Claim 5 wherein the adaptive scaled nonlinearity is given by: $\Psi(|e_n|/s)\text{sign}\{e_n\}s_n$. As stated above apropos of Claim 5, the combination of Kenemasa and Gay makes obvious all elements of that claim. However, the particular formula for the adaptive scaled nonlinearity claimed is neither anticipated nor made obvious by the prior art. Therefore, Claim 9 is allowable matter.

23. Claim 10 is allowable matter due to dependence from Claim 6.

Response to Arguments

24. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Swerdlow whose telephone number is 703-305-4088. The examiner can normally be reached on Monday through Friday between 8:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forrester Isen can be reached on 703-305-4386. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

ds
August 1, 2003


FORESTER W. ISEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2/800